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(12) (19) (CA) **Demande-Application**

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(22) 1997/10/24
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(72) BROULIK, Hynek, CA
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(51) Int.Cl.[6] G06F 9/44, G06F 13/00

(54) **NOEUD GUI COMMUN TELECOM/TRANSPORT BASE SUR LE WEB**

(54) **WEB BASED TELECOM/TRANSPORT NODE COMMON GUI**

Description of the Invention

The WEB Based GUI consists of the following:

(1) Architecture for basic elements (servers, clients, UI engines and applicatons).
The architecture is common on all Transport nodes and OPCs.
Common architecture enables seamless communication of all transport nodes and OPCs in the Sonet/Optical network.
This architecture is achieved by applying WEB technology principles in the design, and is unique in the Telecom /Transport node fields.

(2) Common presentation of information (look and feel) to craft persons.
Presentation is rendered by browsers (Netscape or Explore).
Organization of the screen and its design as far as (a) consistency, (b) speed of presentation and (c) feedback to the user - is unique in the Telecom/Transport node fields.

(3) Design of session management to control Browser sessions and design of utilities to convert application information into the form for the Browser - the inside processing presents a set of original solutions.

The (1) Architecture enables connectivity (access) from any point of the network - brings economical and uniform solution.
The (2) common presentation solves craft person training/mobility and brings fast and modern GUI.
The (3) Session management and utilities enable context sensitive and real time information updating, thereby improving effectivenes of the craft personal.

The Problems Solved

(1) Information presented to surveilance center and info presented to local craft person should be the same

- we need to access the Network Elements locally and as well remotely from surveilance centers
- the information presented should be exactly the same
- this is achieved by the unique architecture and one implementation only - HTML/Java script on the NE itself

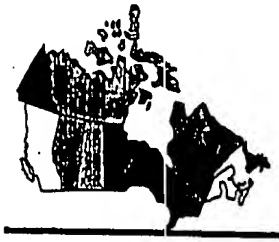
Note: current industry practice is to implement client-server solution, different for local access and remote access. This is expensive and does not bring the same presentation for the surveilance centers and local craft persons (because of the underlying different technology).

(2) All transport Node/OPC UI should have common look and feel

- our customers need intuitive and easy to learn UI - they need to decrease cost of operations, and cost of training their craft persons. As intuitive UI prevents human errors it is very important considerations for large network operators.
- our customers need common UI for all our products (for above and other reasons)
- Common UI is achieved by using WEB based Technology and unique design of our screens

When we introduce the WUI, OC-192, OC-48 and OC12 will achieve all of above requirements

Note: Current situation - Nortel has different and not user friendly UIs. The competion does offer GUI, but not the WEB Based GUI.



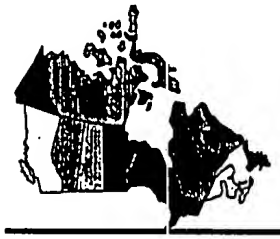
The Problems Solved

(3) Context sensitive and real time information is required

- for large network operations, humane error means loss of traffic and huge economical loss, possible emergency situations. Our customers need reliable, responsive UI, easy to use to minimize possibility of human errors.

- WEB Based GUI with the unique NE session management and utilities offer such a capability

Current situation: - since all NORTEL UIs are implemented differently, there are inherent inconsistencies between defferent UIs on ddifferent products. If the craft persons are operating more products, they can make mistakes when moving from one to another product



Prior Art

(1) Nortel Current UI is text based (VT100 based), not GUI

(2) Current industry practice, consists of client - server proprietory implementations, using Visual C++ (or Basic) and proprietory protocols. In fact this has been implemented for OC-3 in 1996.

This solutions is expensive (needs to be repeated for every platform) . The remote access does not provide the same presentations - because of underlying different technologies.

As well it creates logistic nightmare (expensive) for version management of clients and servers. (For both supplier and user).

(3) HTTP server running on one node (outside - like Unix WS, or inside network - like OPC) and proprietory protocol between server side CGIs and UI engines on Network elements

This solution was tried in one of our early prototypes. I t is common in current industry WEB based solutions. This architecture does not work for fast response time, it is slow and not reliable.
It does not work well for remote accesses (remote login requirements) - the response time is very long - not really acceptable for Transport nodes.

(4) HTTP server running on one node and providing one transaction at a time, without concept of a session. This approach is used for some network management packages or database retrieval info systems.
This is based on 'stateless' server paradigm.

Elements and Advantages

(1) Information presented to surveilance center and info presented to local craft person should be the same

- presentation part, definition of the screens and utilities generating dynamic screens are implemented once on the node which is being accessed either locally or remotely. This guarantees that the same information will be presented always the same way
- from corporation point of view - the design and implementation is done only once, it does not need to be repeated on the network management node and the local node

(2) All transport Node/OPC UI should have common look and feel

- using the WEB technology, HTML, CGI, HTTP protocols, with the same GUI elements (e.g. buttons, lists, hypertext links) on all transport nodes will bring the same look and feel automatically
- substantial part of the screen definitions and utilities generating dynamis screens will be reused on all transport nodes (appr 80 %), giving us identical screens/presentations
- from the corporation point of view, this represents significant saving of design and implementation work

(3) Context sensitive and real time information is required

- context sensitivity, session management and real time updating is achieved by combination of specially designed utilities and WEB technology elements (like hypertext, push, frames, etc).
- using WEB technology elemnts represents economical and uniform solutions, with the possibility of future expansion (e.g. audio alarm reporting, audio commands when supported by HTTP protocol)

Commercial Importance

Note: C mmercial spec is available - we can supply if needed

(1) Our cust mers require uniform GUI for all Nortel products.

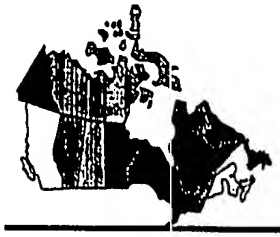
This invention (technology) in the only solution viable economically and technically. Without this approach and technology we would not be able to develop (design, implement and coordinate) GUIs for all products.

For our customers, uniform WEB based UI represents huge saving in training craft persons, flexible operations (the client is a browser, craft person can save UI results in files, e-mail, print, use in applications like excel available on a PC), reusing the craft persons in opertions on any Nortel equipment, potentially customized UI, etc.

(2) At this time, our competitiors (Fujitsu, Lucente) provide Gui on their products.

This means that our customers prefer GUIs, they experienced them and a asking us to provide GUIs on our products.
However, our competitors do not have WEB based GUI, i.e. they are developing their GUI using the old client-server technology.

Using this invention, we will provide more flexible, common GUIs on all our nodes and we will reverse the current situation, i.e. we will gain competitive advantage.

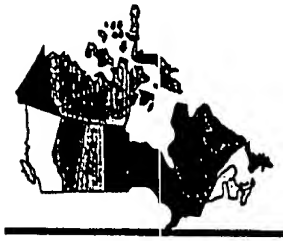


Description of WUI

The Following slides provide summary of presentations given to our customers during our Customer Interaction Program.

The following is presented:

(1) Summary of tech. specifications of WUI
(2) Major requirements
(3) Architecture of major SW components on Transport Node (i.e. Network Element)
(4) PC/Laptop - recommended configuratios
(5) Outline of a local access
(6) Outline of a remote (NE to NE) access
(7) Outline of a remote (INM to NE) access
(8) Screen layout - general description
(9) Screen design samples - major screens



WUI

UI type:

GUI,intuitive, point and click, direct object manipulation

- context sensitive presentation
- consistent with major Nortel products OC-48 and OC-12
- targeted towards all levels of users and non frequent users
- designed with *Consistency, Speed* and *User Feedback*

What is not supported

- does not support scripting (available through PC, Silktest.)
- shelf graphics
- on-line and context sensitive help
- on-line NTPs and Caps

Planned

on-line help, context sensitive help, NTPs, CAPS

- shelf graphics under consideration
- becoming main OC-192 UI

Requirements

- intuitive and easy to learn to minimize training

  easy to use to prevent human errors

- context sensitive and real time info updating to speed up operations

  runs on Unix/Windows/Mac (same appearance)

- platform independent (Windows 95, Unix, etc)

- network user interface

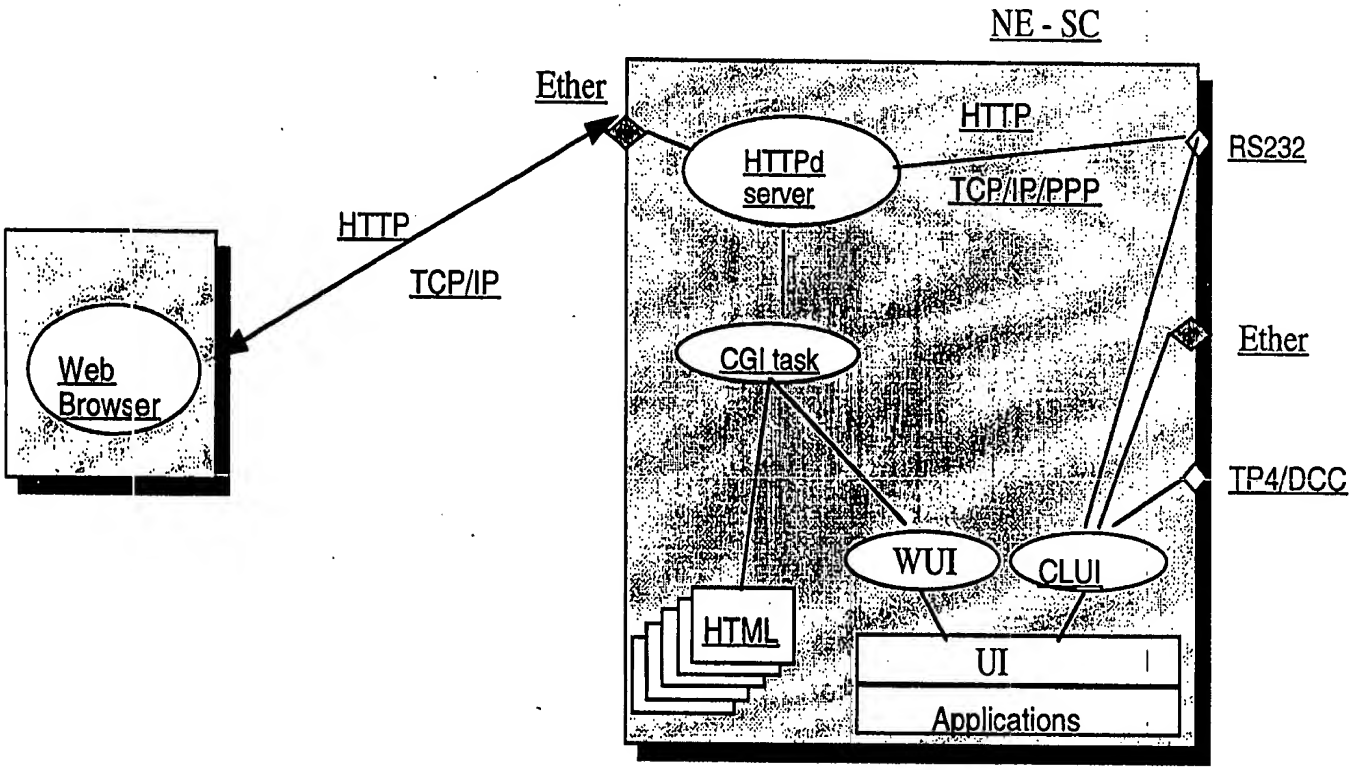
  must support NE-NE remote login

  must support reach-thru from INM

  - client and server software releases must not be "bundled"

- four sessions either locally or remotely

OC-192 WUI Architecture



(1) Off the shelf WEB browser on PC/Mac/Unix WS
(2) Extensive connectivity via TCP/IP and RS232/PPP

Note: For more description see Notes

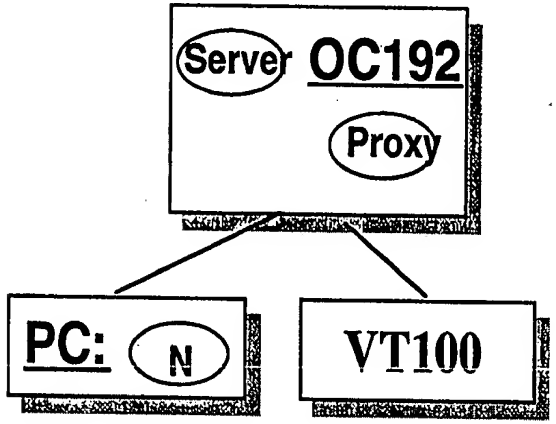
PC configuration

	IE4	IE3	N4	N3
CPU	486/66	386DX	486	386SX
MEM	8	8	16	8
HDD	50	10	16	10

IE=Microsoft Internet Explorer, N=Netscape Navigator

MEM in MB
HDD in MB

WUI local access

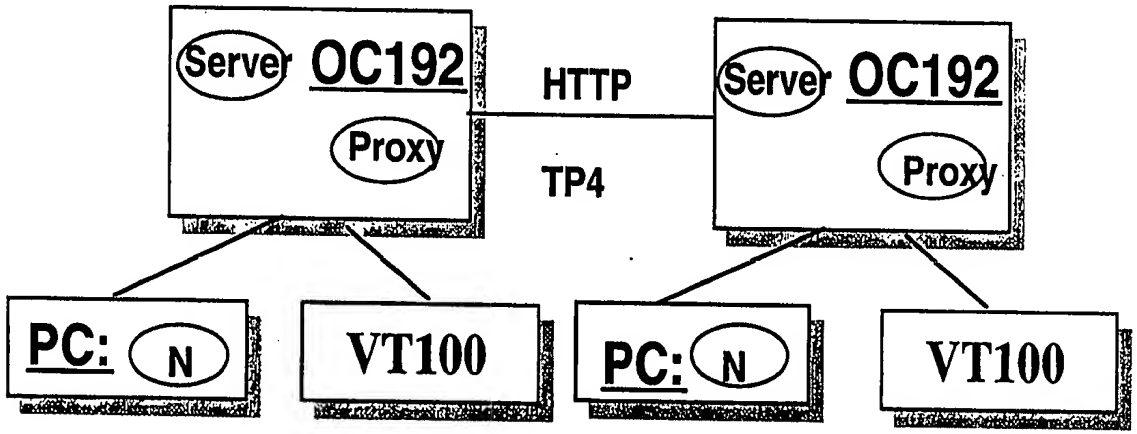


MI Ethernet
MI RS232 port

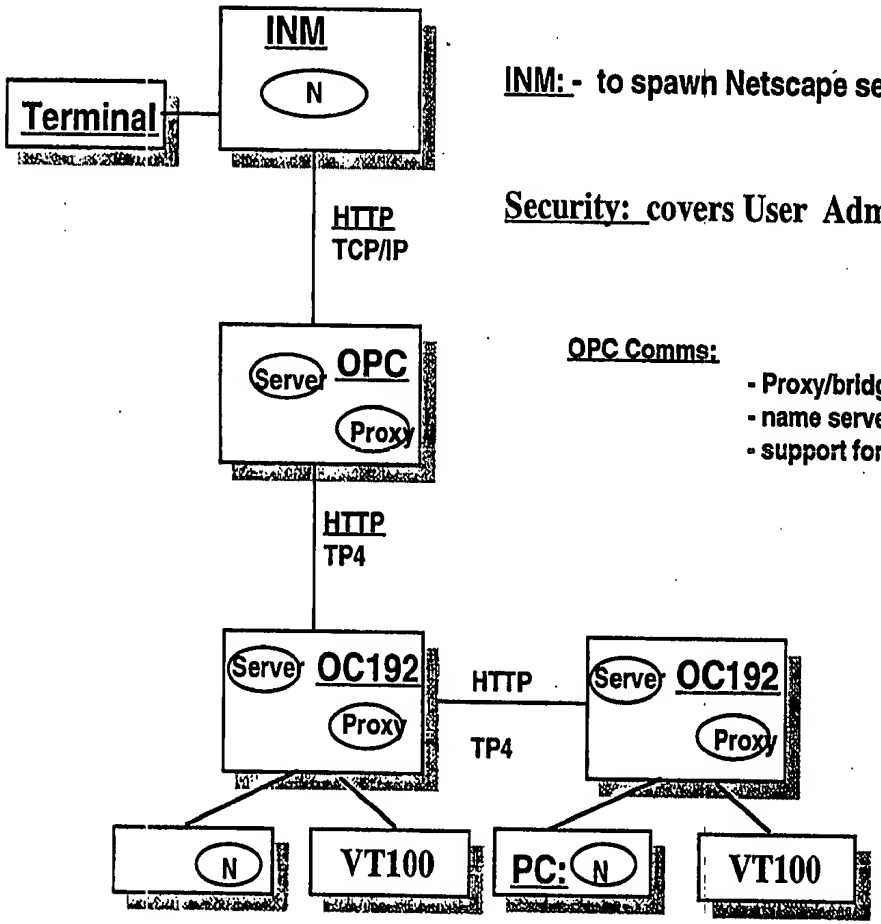
LCAP RS232 port
MI RS232 port

MI RS232 port configurable as CLUI or WUI (direct or via modem)

WUI NE-NE login



WUI INM reach-thru



INM: - to spawn Netscape session to reach-thru NEs

Security: covers User Administration and Access

OPC Comms:

- Proxy/bridger
- name server (addressing)
- support for INM reach through

NEs: - HTTP server
- UI interface to Server
- HTML files (screens)

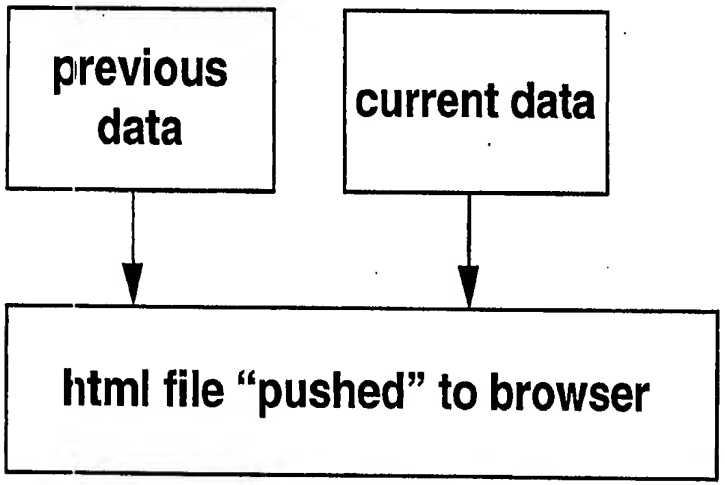
Dynamic screens

- Network/local banner line screens

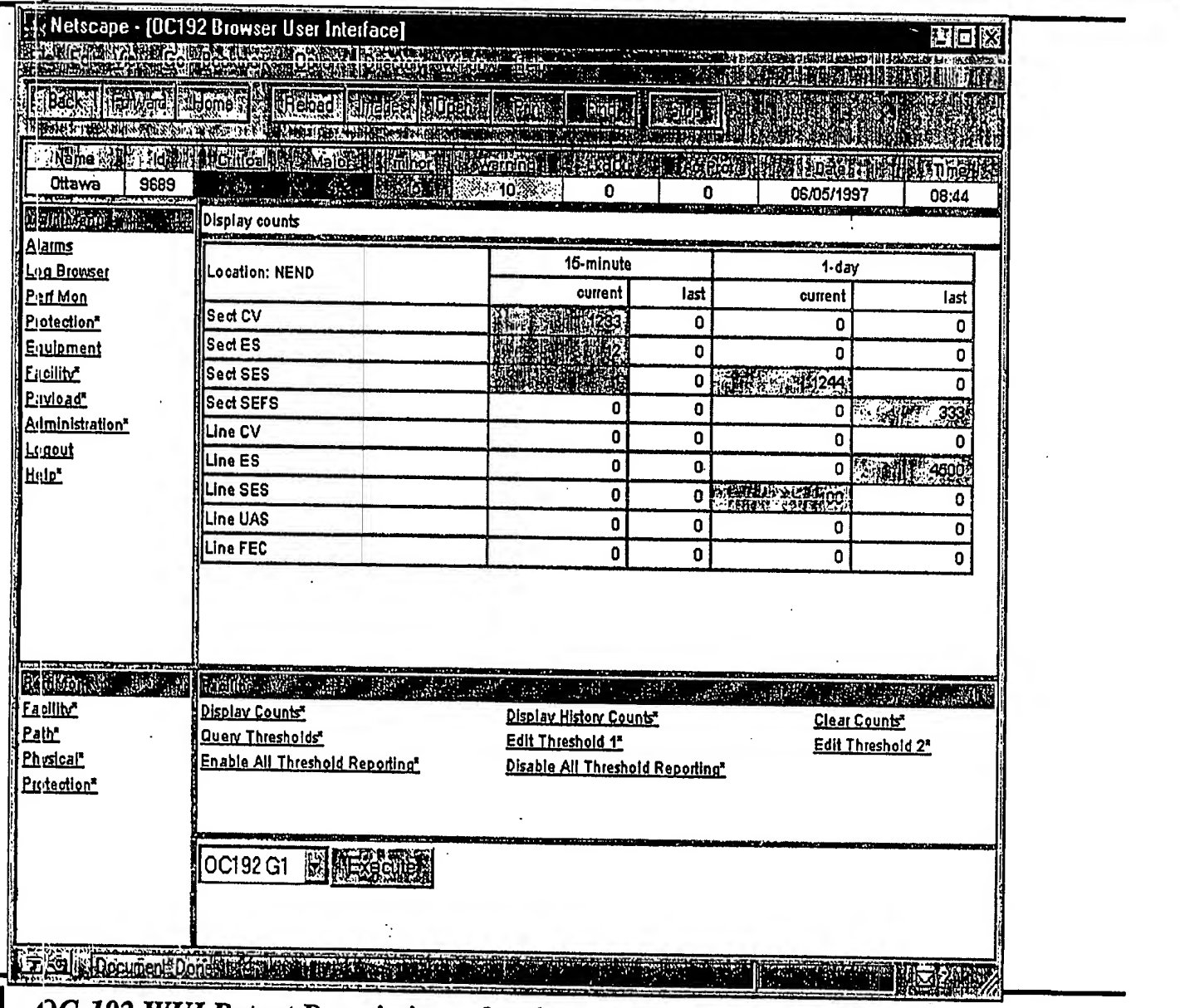
  Performance monitoring screens

  Protection switching screen

  Implemented as server push



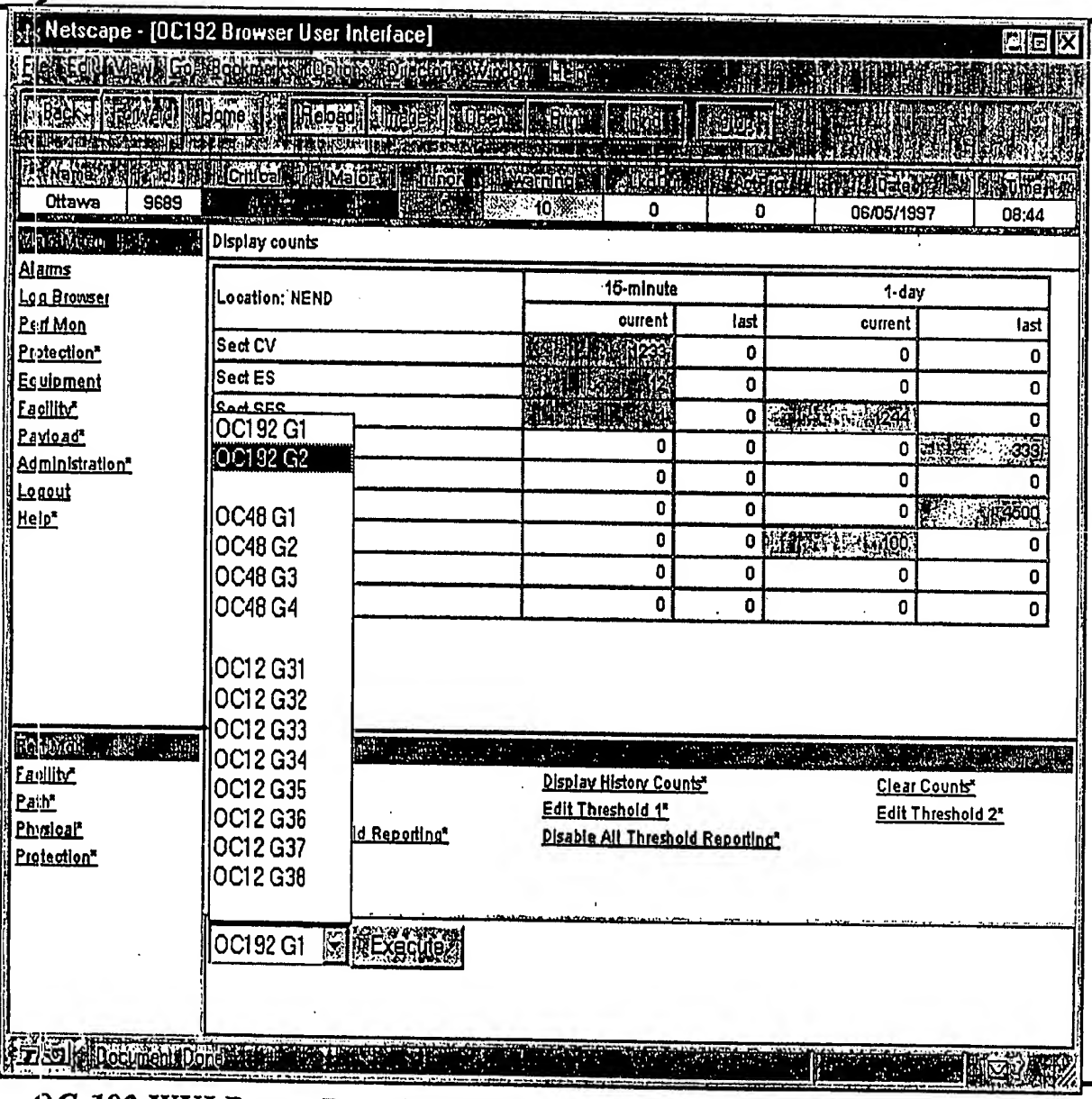
Dynamic screen example

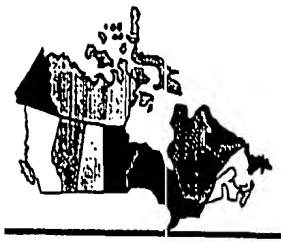


Context sensitivity

- two menu sets for commissioned/uncommissioned NE
- only options applicable to a command presented
- commands tailored to user priviledges

Context sensitivity example





GUI building blocks

- **no pictures used - DCC bandwith saved**
- **HTML hypertext, links, buttons, forms, tables**

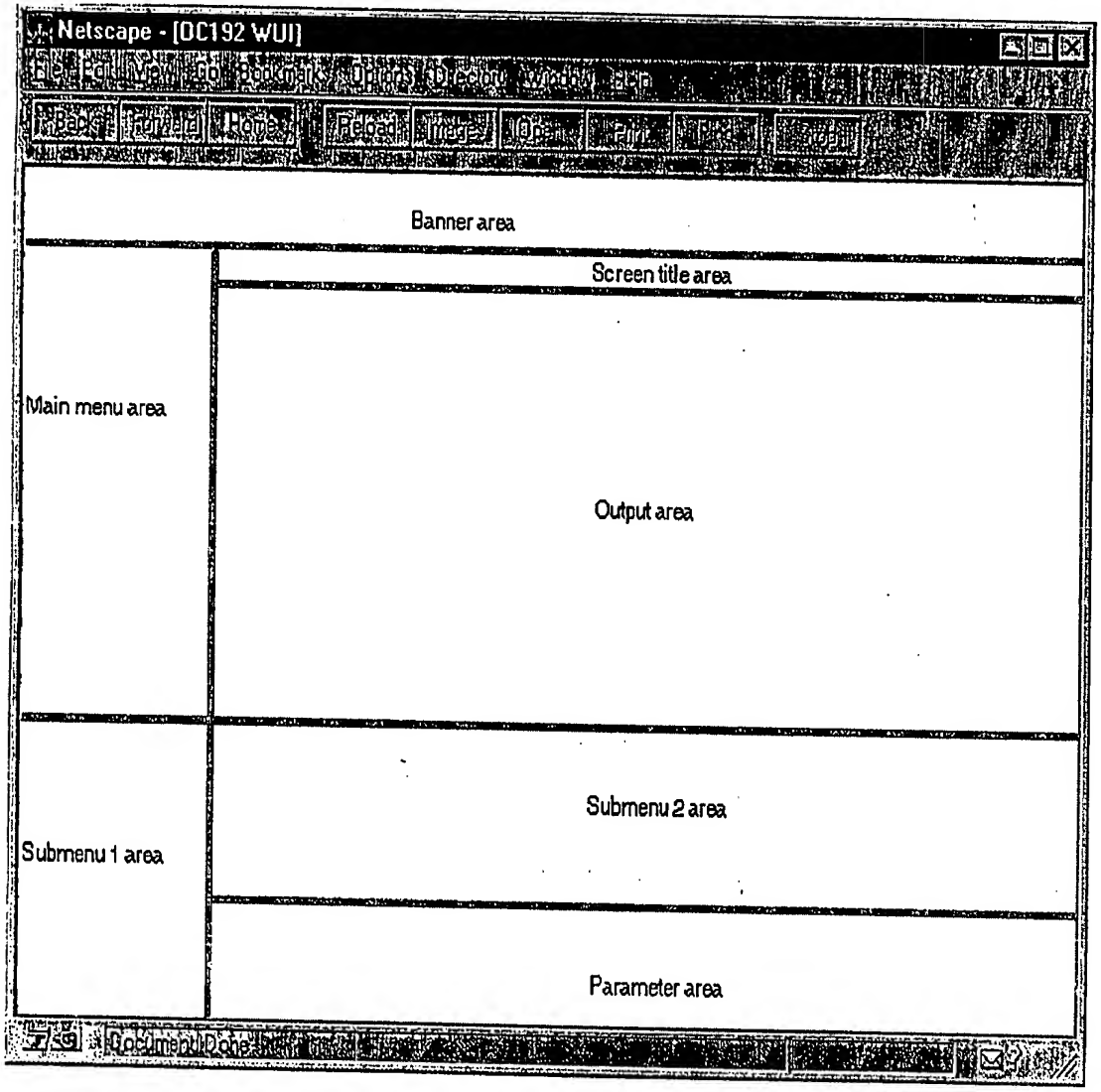
  minimal Java, only JavaScript

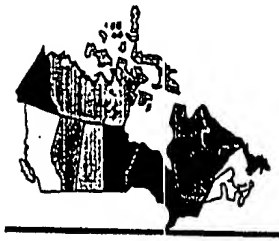
  consistent navigation accross all screens
- **consistent data presentation**

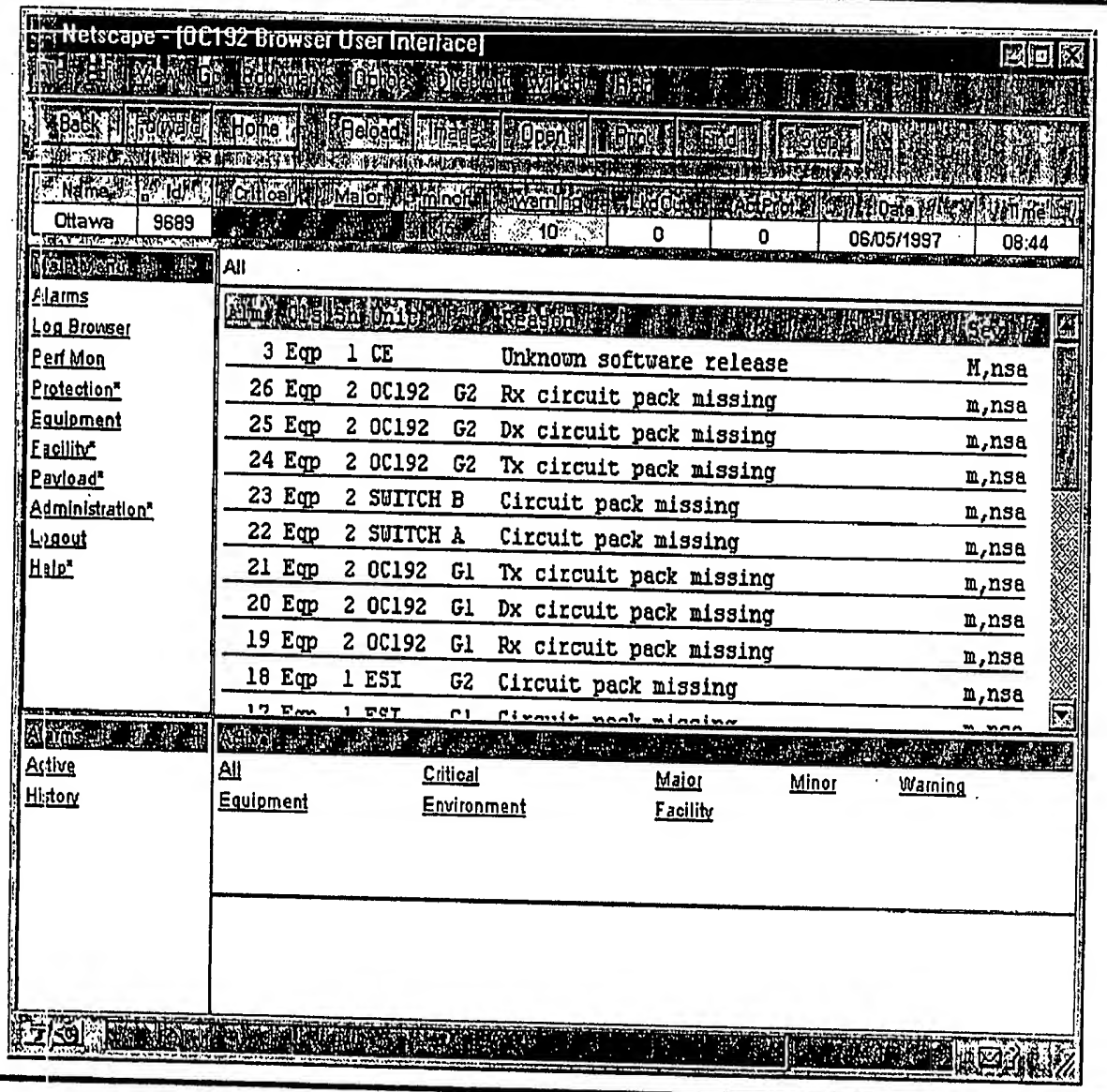
  output can be saved, printed from browser

  no shelf graphics in first implementation

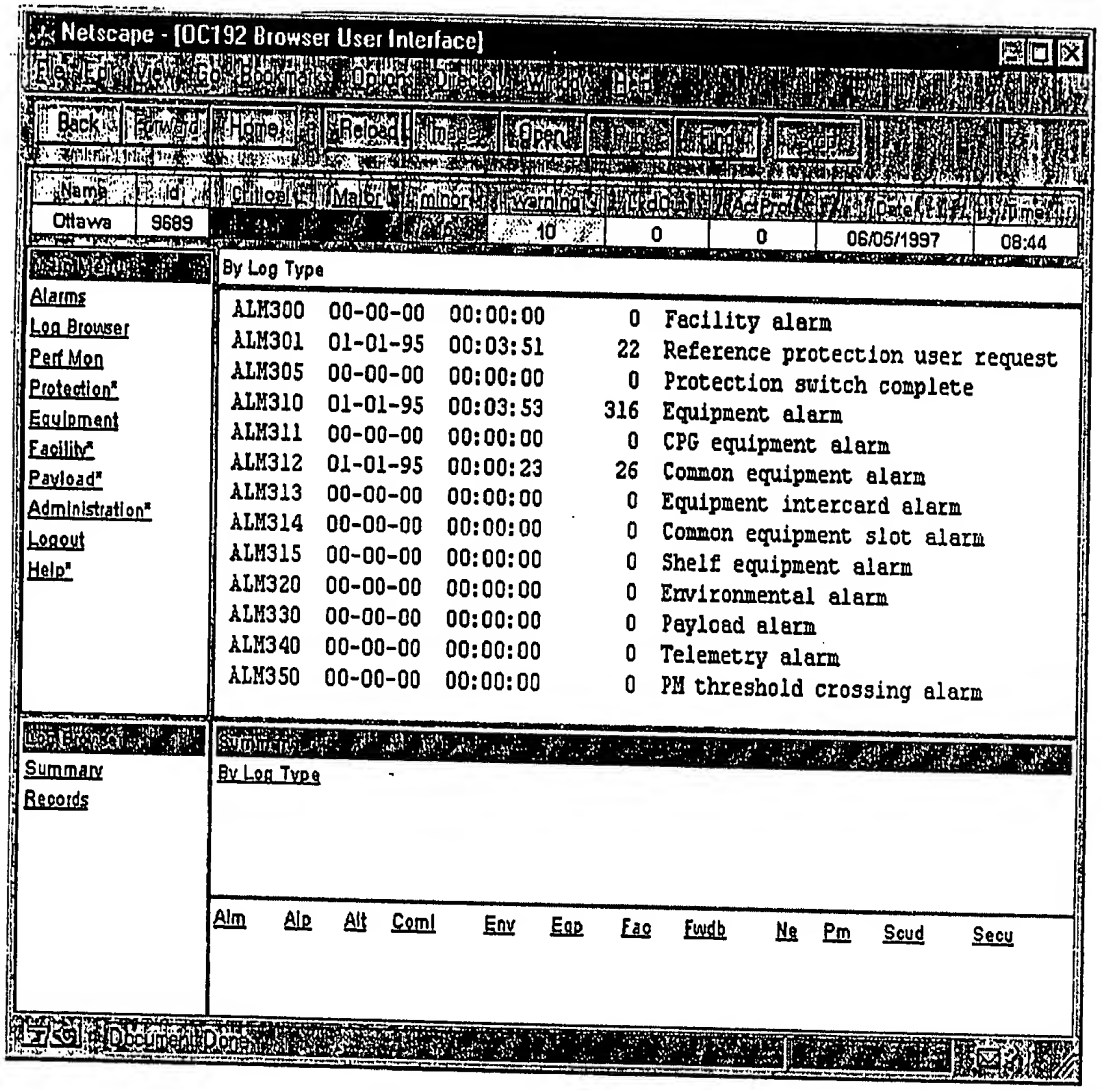
Screen Layout







3	Eqp	1	CE	Unknown software release	M,nsa
26	Eqp	2	OC192 G2	Rx circuit pack missing	m,nsa
25	Eqp	2	OC192 G2	Dx circuit pack missing	m,nsa
24	Eqp	2	OC192 G2	Tx circuit pack missing	m,nsa
23	Eqp	2	SWITCH B	Circuit pack missing	m,nsa
22	Eqp	2	SWITCH A	Circuit pack missing	m,nsa
21	Eqp	2	OC192 G1	Tx circuit pack missing	m,nsa
20	Eqp	2	OC192 G1	Dx circuit pack missing	m,nsa
19	Eqp	2	OC192 G1	Rx circuit pack missing	m,nsa
18	Eqp	1	ESI G2	Circuit pack missing	m,nsa


Netscape - [OC192 Browser User Interface]
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Main Menu
Alarms
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Equipment
Facility*
Payload*
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Logout
Help*
By Log Type
ALM300 00-00-00 00:00:00 0 Facility alarm
ALM301 01-01-95 00:03:51 22 Reference protection user request
ALM305 00-00-00 00:00:00 0 Protection switch complete
ALM310 01-01-95 00:03:53 316 Equipment alarm
ALM311 00-00-00 00:00:00 0 CPG equipment alarm
ALM312 01-01-95 00:00:23 26 Common equipment alarm
ALM313 00-00-00 00:00:00 0 Equipment intercard alarm
ALM314 00-00-00 00:00:00 0 Common equipment slot alarm
ALM315 00-00-00 00:00:00 0 Shelf equipment alarm
ALM320 00-00-00 00:00:00 0 Environmental alarm
ALM330 00-00-00 00:00:00 0 Payload alarm
ALM340 00-00-00 00:00:00 0 Telemetry alarm
ALM350 00-00-00 00:00:00 0 PM threshold crossing alarm
Log Browser
Summary
Records
Summary
By Log Type
Alm Alp Alt Coml Env Eqp Fac Fwdb Ne Pm Scud Secu
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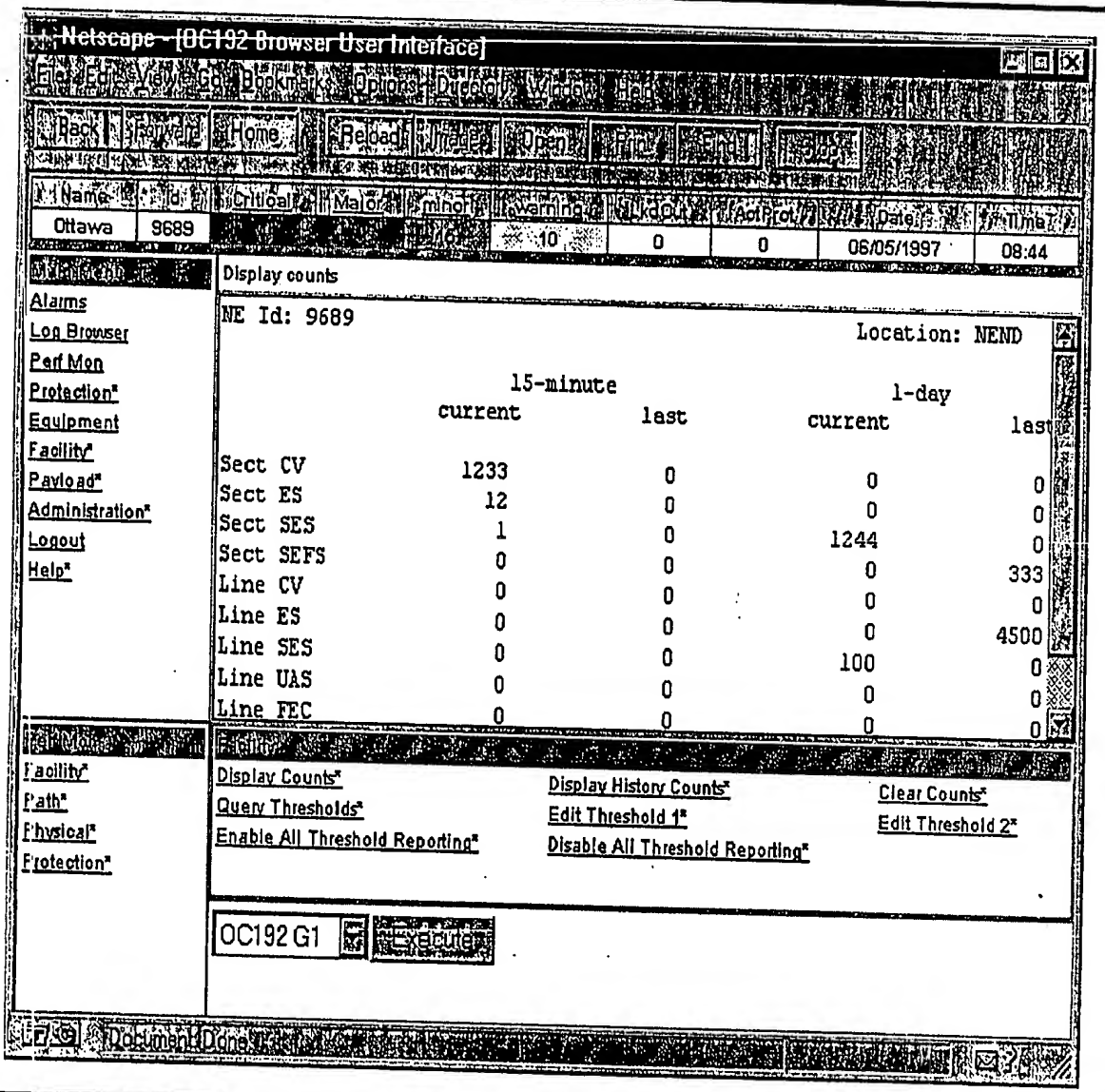
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Main Menu
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Logout
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NE Id: 9689
Location: NEND
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Sect CV 1233 0 0 0
Sect ES 12 0 0 0
Sect SES 1 0 1244 0
Sect SEFS 0 0 0 333
Line CV 0 0 0 0
Line ES 0 0 0 4500
Line SES 0 0 100 0
Line UAS 0 0 0 0
Line FEC 0 0 0 0
Facility*
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OC192 G1
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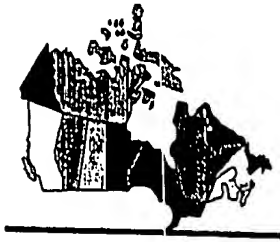

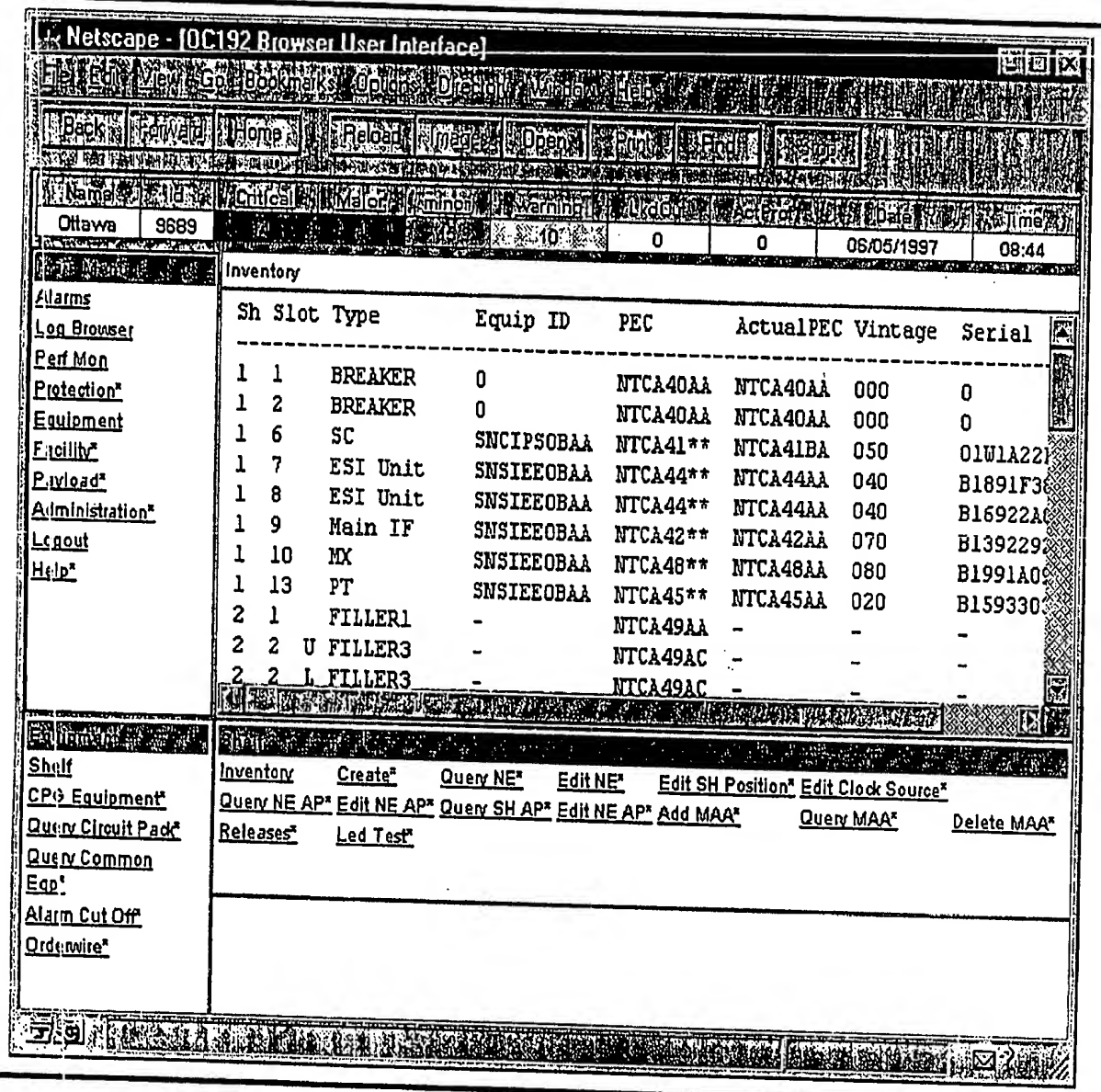
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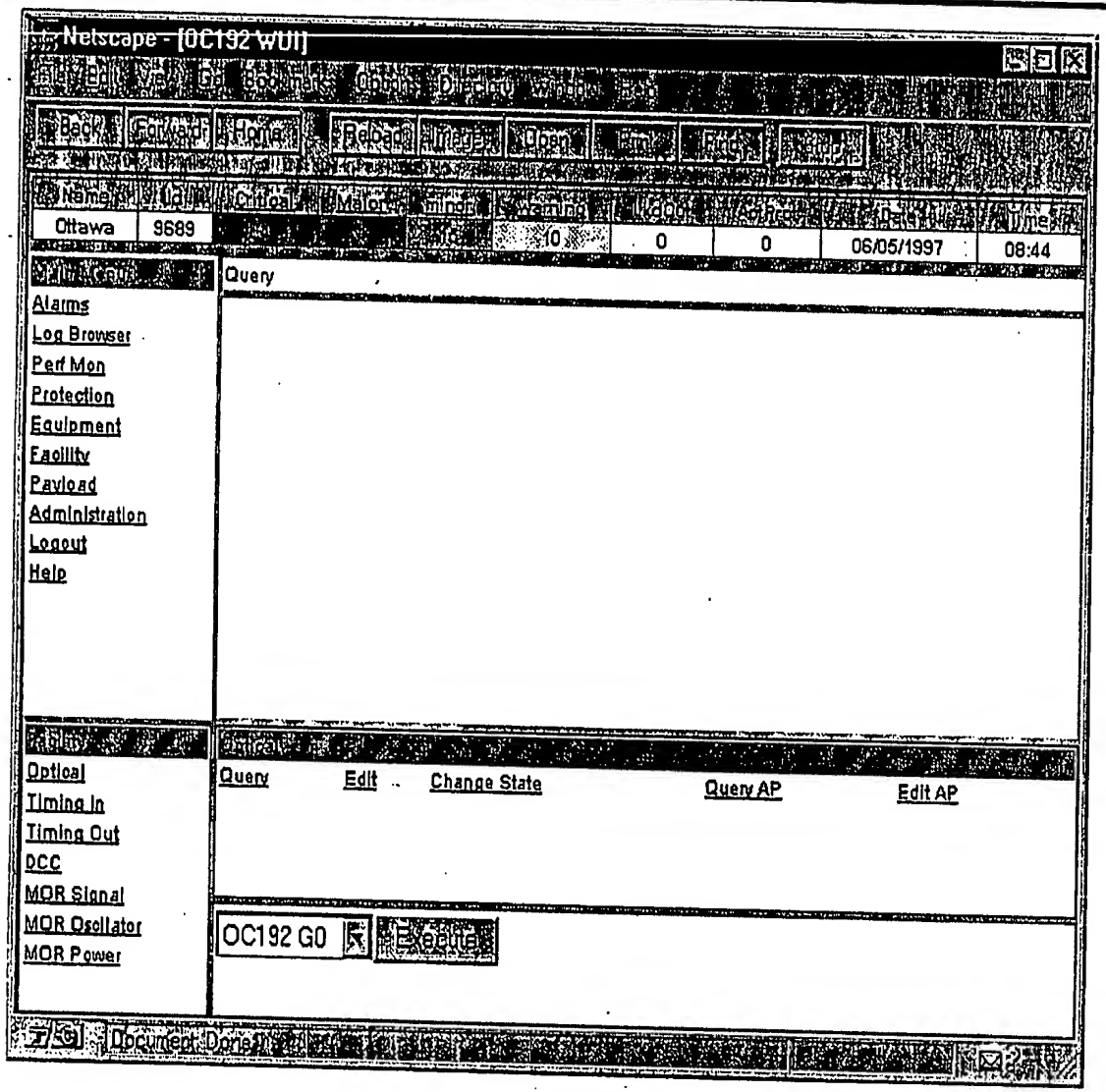
1 1 BREAKER 0 NTCA40AA NTCA40AA 000 0
1 2 BREAKER 0 NTCA40AA NTCA40AA 000 0
1 6 SC SNCIPSOBAA NTCA41** NTCA41BA 050 01W1A221
1 7 ESI Unit SNSIEEOBAA NTCA44** NTCA44AA 040 B1891F3
1 8 ESI Unit SNSIEEOBAA NTCA44** NTCA44AA 040 B16922A
1 9 Main IF SNSIEEOBAA NTCA42** NTCA42AA 070 B139229
1 10 MX SNSIEEOBAA NTCA48** NTCA48AA 080 B1991A0
1 13 PT SNSIEEOBAA NTCA45** NTCA45AA 020 B159330
2 1 FILLER1 - NTCA49AA - - -
2 2 U FILLER3 - NTCA49AC - - -
2 2 L FILLER3 - NTCA49AC - - -
Shelf
CPS Equipment*
Query Circuit Pack*
Query Common Eqp*
Alarm Cut Off*
Orderwire*
Inventory Create* Query NE* Edit NE* Edit SH Position* Edit Clock Source*
Query NE AP* Edit NE AP* Query SH AP* Edit NE AP* Add MAA* Query MAA* Delete MAA*
Releases* Led Test*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Help
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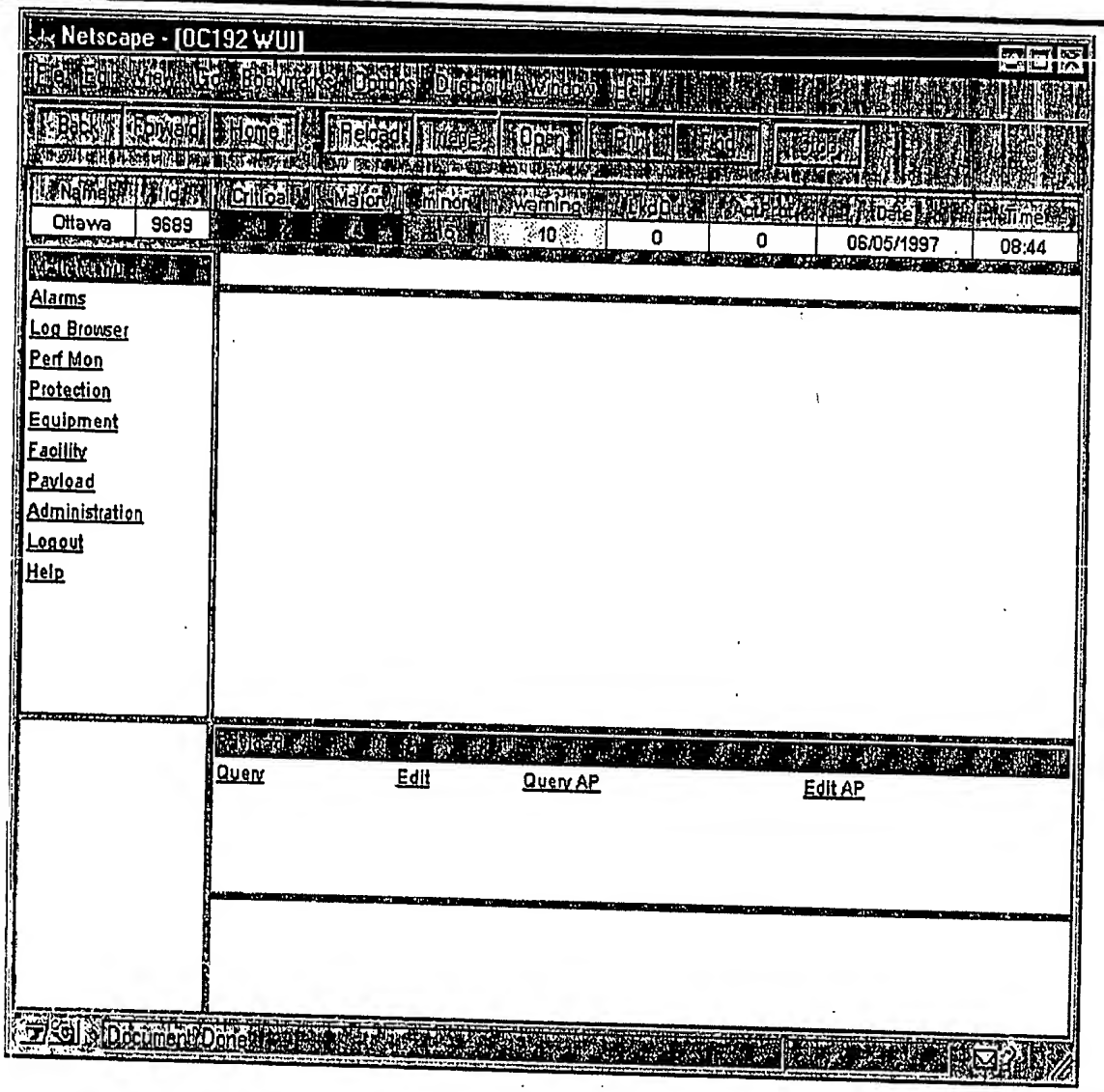
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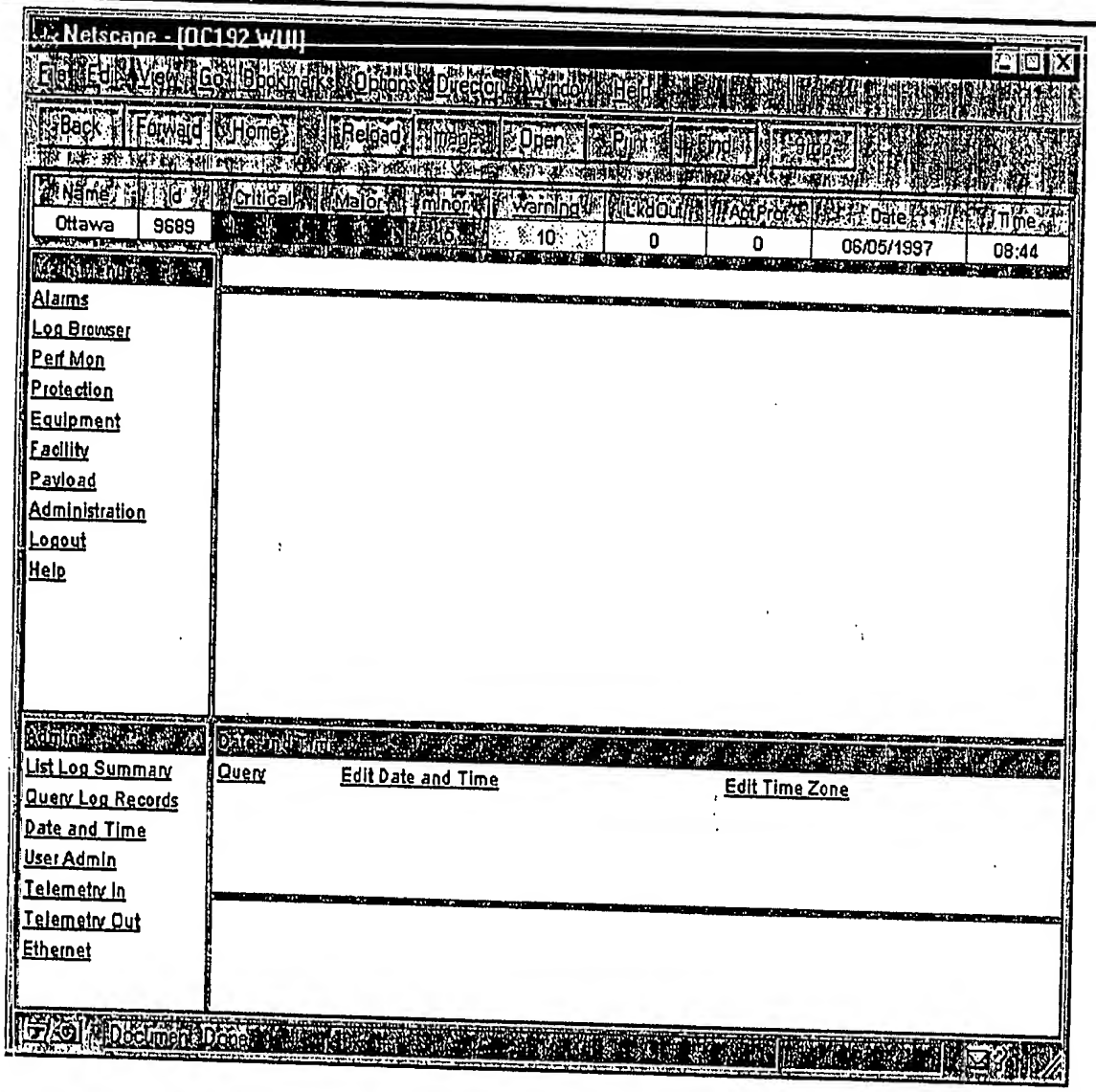
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Ottawa 9689 10 0 0 06/05/1997 08:44
Alarms
Log Browser
Perf Mon
Protection
Equipment
Facility
Payload
Administration
Logout
Help
List Log Summary
Query Log Records
Date and Time
User Admin
Telemetry In
Telemetry Out
Ethernet
Query
Edit Date and Time
Edit Time Zone
Document Done

WHAT IS CLAIMED IS:

1. A network processor comprising:

a hypertext protocol server;

a plurality of hypertext files;

a web user interface;

a task for coupling the web user interface and the plurality of hypertext files to the hypertext-protocol server and an interface for interfacing the web user interface to a user interface and application for monitoring the network processor.